IN THE UNITED STATES DISTRICT COURT

FOR THE DISTRICT OF DELAWARE

VOLTERRA SEMICONDUCTOR LLC,	)	
Plaintiff,	)	**Redacted - Public Version**
v.	)	C.A. No. 19-2240-CFC-SRF
MONOLITHIC POWER SYSTEMS, INC.,	)	[redacted]
Defendant.	)	

DECLARATION OF FORREST A. JONES IN SUPPORT OF DEFENDANT MONOLITHIC POWER SYSTEMS, INC.'S REPLY BRIEFS FOR MPS'S MOTIONS FOR SUMMARY JUDGMENT (NOS. 1-3)

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Dated: January 7, 2022

1. I, Forrest A. Jones, am an attorney with Finnegan, Henderson, Farabow, Garrett & Dunner, LLP, admitted *pro hac vice* before this honorable Court to represent defendant Monolithic Power Systems, Inc. ("MPS") in this matter. I provide this declaration based on my personal knowledge.

2. Attached as Exhibit 31 is a true and correct copy of excerpts from the Deposition Transcript of Mr. Rohan Samsi, which was taken on Oct. 31, 2021.

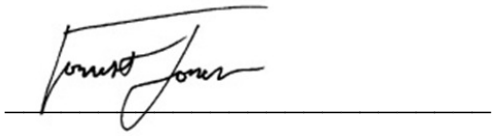
3. Attached as Exhibit 32 is a true and correct copy of excerpts from the Joint Claim Construction Brief, which was filed by Volterra as D.I. 168.

4. Attached as Exhibit 33 is a true and correct copy of excerpts from the Deposition Transcript of Joshua Phinney, which was taken on October 22, 2021.

5. Attached as Exhibit 34 is a true and correct copy of excerpts from the Declaration of Dr. Douglas C. Hopkins In Support of Petition for Inter Partes Review of U.S. Patent No. 6,362,986, in IPR2020-1368.

6. Attached as Exhibit 35 is a true and correct copy of excerpts from the Declaration of Dr. Douglas C. Hopkins In Support of Petition for Inter Partes Review of U.S. Patent No. 6,362,986, in IPR2020-1370.

7. I declare under penalty of perjury that the foregoing is true and correct, executed on January 7, 2022.



Forrest A. Jones

Exhibit 31

Redacted in its entirety

EXHIBIT 32

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

VOLTERRA SEMICONDUCTOR LLC, Plaintiff, v. MONOLITHIC POWER SYSTEMS, INC., Defendant.	C.A. No. 19-2240-CFC

JOINT CLAIM CONSTRUCTION BRIEF

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V. DISPUTED CONSTRUCTIONS

A. "orienting, in like direction" (Claim 17 – '986 Patent)

Volterra's Construction	MPS's Construction
plain meaning	original: "windings are wound in such a way so that mutual flux between the windings flows in opposite directions" revised: "windings are wound in such a way so that flux between the windings flows in opposite directions ['about the common core']"

1. Plaintiff's Opening Position

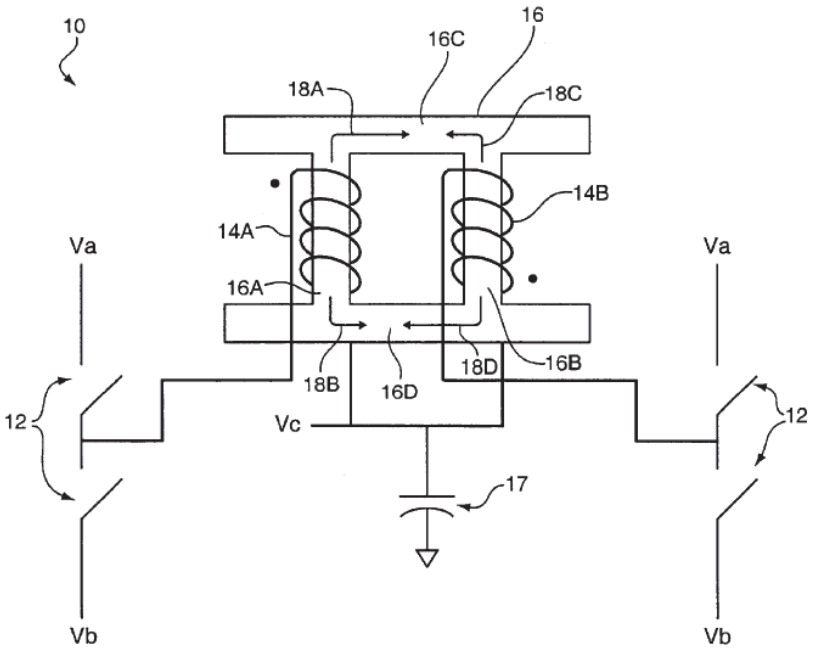
The claim language surrounding this term makes clear that the purpose of the "orienting" is "to increase coupling between the windings." Sufficient guidance is thus provided by the claim language itself, eliminating the need for any further construction of "orienting." A fact finder will recognize that "orienting" the windings is simply positioning the windings to comply with the remaining claim limitations. Indeed, this is the understanding that MPS used when mapping prior art to this term in its IPR petitions. (IPR2020-1368, Paper 3, Petition for *Inter Partes* Review at 11-12; IPR2020-1370, Paper 3, Petition for *Inter Partes* Review at 11-12.)

MPS introduces confusion by referring to "mutual flux"—a new, technical term. The patent never uses the word "mutual" nor describes the requisite orientation in terms of "mutual flux." Rather, the patent explains the correct orientation through a series of examples. (*See, e.g.*, D.I. 134-1 at 2:24-28 ("To

clarify what is intended by the orientation of the windings, when the two windings both have positive current, the flux generated around the main magnetizing flux path by one should be counterclockwise, whereas the flux generated by the other should be clockwise."); 7:15-16 ("FIGS. 3A and 3B provide further understanding of how windings are properly oriented in accord with the invention.").) By ignoring these examples and introducing "mutual flux," MPS's construction would unnecessarily confuse the jury.

MPS's requirement of flux flowing "in opposite directions" also contradicts an embodiment described in the patent. The specification uses the scenario of Figure 1 as an example of the correct orientation, where "the two windings are wound around opposite sides of a square post, [and] both produce flux **in the same direction** in Cartesian coordinates, given positive current." (*Id.* at 2:30-31 (emphasis added).)

FIG. 1



By requiring opposite directions without specifying the frame of reference, MPS's proposed construction improperly reads out this embodiment.

2. Defendant's Answering Position

Volterra's Construction	MPS's Construction
plain meaning	"windings are wound in such a way so that flux between the windings flows in opposite directions ['about the common core']"[4]

[4] Volterra objects to MPS's proposal because it includes a "new, technical term:" "mutual." As a compromise, MPS's current proposal drops that term as unnecessary, because the proposal already includes the phrase "flux between the windings," which is "mutual" flux. Also, MPS added the phrase "about the common core" (as recited in claim 17 of the '986 Patent) in brackets to emphasize that while the phrase is not part of the construction for this term, it does offer context for how the term should be interpreted (i.e., that flux generated by the first

"Orienting, in like direction" is a technical term where the meaning would not be intuitively apparent to a juror, thus requiring a construction. MPS's construction for this term is understandable and directly corresponds to the descriptions in the '986 Patent. Volterra's suggestion of "plain meaning" improperly leaves the jury to resolve the meaning of the term. *O2 Micro Intern. Ltd. v. Beyond Innovation Tech. Co., Ltd.*, 521 F.3d 1351, 1361 (Fed. Cir. 2008) (holding that plain and ordinary meaning may be inadequate when it does not resolve the parties' dispute on claim scope).[5]

Volterra's failure to offer a construction is particularly inappropriate here because the patent specification explains what is meant by this technical term. *See Every Penny Counts, Inc. v. Am. Express Co.*, 563 F.3d 1378, 1382 (Fed. Cir. 2009) ("In most cases, the best source for discerning the proper context of claim terms is the patent specification."). In the context of this patent, "same" or "like" direction actually means the opposite direction. *See* '986 Patent at 2:24-27 ("To clarify what is intended by the orientation of the windings, when the two windings

---

and second windings about the common core flows counterclockwise and clockwise, or vice versa) within the claim language this term is found.

[5] Volterra's argument that the "claim language surrounding this term makes clear that the purpose of the 'orienting' is 'to increase coupling between the windings'" fails because "to increase coupling between the windings" is indefinite. Per the Court's guidance to the parties, MPS will show why the term "to increase coupling between the windings" is indefinite in its forthcoming summary judgment motion. *See* Hr'g Tr. (May 12, 2021) at 18:22-24.

both have positive current, the flux generated around the main magnetizing flux path by one should be ***counterclockwise***, whereas the flux generated by the other should be ***clockwise***."); 7:10-23 ("In structure 41, windings 42A, 42B ***are considered in the same orientation because*** a current flow toward V_c in both [windings] leads to ***flux flow in opposite directions*** around the main, ungapped path of the core 45, just as in FIG. 1.").[6] Recognizing the inherent ambiguity in "orienting, in like direction,"—ambiguity Volterra wants to maintain—the '986 Patent explains that, in the patent, two windings are in the "same" or "like" direction when flux between the windings flows in ***opposite direction about the***

[6] While MPS's construction is correct and should be adopted by the Court, the technically precise meaning of "orienting, in like direction" is "windings are wound in such a way so that flux between the windings flows in opposite directions around the main, ungapped path of the common core when current flows in the windings toward the output voltage" or alternatively "windings are wound in such a way so that flux between the windings flows in opposite directions around the main magnetizing flux path of the common core when current flows in the windings toward the output voltage," as the cited passages from the '986 Patent indicate. The construction may also be framed in a technically precise way to highlight the counterclockwise and clockwise flow of flux as: "windings are wound in such a way so that flux between the windings flows clockwise for the first winding and counterclockwise for the second winding, or vice versa, around the main, ungapped path of the common core when current flows in the windings toward the output voltage" or alternatively "windings are wound in such a way so that flux between the windings flows clockwise for the first winding and counterclockwise for the second winding, or vice versa, around the main magnetizing flux path of the common core when current flows in the windings toward the output voltage."
However, these constructions would be less helpful to the jury because they contain more technical jargon. If the Court disagrees and decides that one of these alternatives would be helpful to the jury, MPS would accept any of them.

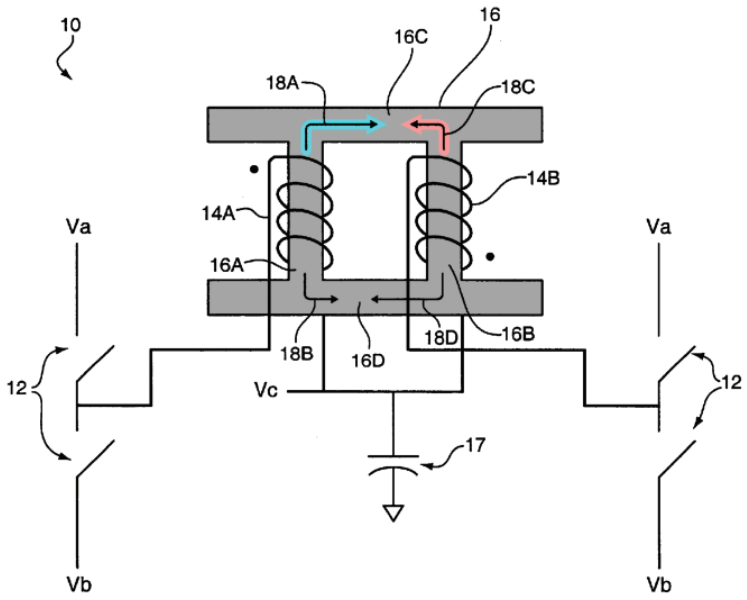
common core (e.g., clockwise, counterclockwise). This term needs construction because the '986 Patent uses the term in a way that would be counterintuitive to jurors. *See, e.g., Sulzer Textil A.G. v. Picanol N.V.*, 358 F.3d 1356, 166 (Fed. Cir. 2004) (explaining that the court needs to "provide the jury [] with instructions adequate to ensure that the jury fully understands the court's claim construction rulings and what the patentee covered by the claims").

Volterra mischaracterizes the '986 Patent's disclosures to argue that MPS's requirement of flux flowing in "opposite direction" contradicts one of the disclosed embodiments. Joint Brief at 20-22. The '986 Patent explains two windings have "like" orientation when the flux generated by the windings flows in opposite directions about the common core (clockwise for one and counterclockwise for the other). '986 Patent at 2:24-33. The patent then explains how this can be described as flux in the same direction ***in Cartesian coordinates***, but, as explained below, this result means that the flux flows in opposite direction ***about the common core***, as required by MPS's construction. *Id*. at 2:28-33.

In discussing Figure 1 (shown annotated below), the specification explains that the windings 14A and 14B are wound in "like" direction. '986 Patent at 5:7-8. Further, the patent states that operation of the structure shown in Figure 1 is similar to operation of the structure shown in Figure 3A. *Id*. at 7:19-23 ("In structure 41, windings 42A, 42B ***are considered in the same orientation because*** a current flow

toward V_c in both [windings] leads to ***flux flow in opposite directions*** around the main, ungapped path of the core 45, ***just as in FIG. 1***."). If the current in both windings flows toward V_c in Figure 1 (as prescribed by the above passage), that means the flux generated by winding 14A will be in the direction of arrow 18A and the flux generated by winding 14B will be in the direction of arrow 18C, as indicated by the highlighted arrows below (i.e., in opposite directions about the common core). '986 Patent at 5:7-26; JA-059-JA-128, IPR2020-1368, Paper 9, at JA-077-JA-079; JA-129-JA-192, IPR2020-1370, Paper 9, at JA-147-JA-149. But the flow of flux about the common core can also be thought of as flow in the same direction ***in Cartesian coordinates***, because the pair of red-blue arrows in annotated Figure 1 below are both pointed up before they turn left or right:

FIG. 1



'986 Patent at Fig 1 (annotations added). Contrary to Volterra's position, that does not mean that the flux between the windings does not flow in ***opposite directions about the common core***. *See id*. at 2:24-33; 5:7-26; 7:19-23; *see also* JA-059-JA-128, IPR2020-1368, Paper 9, at JA-077-JA-079; JA-129-JA-192, IPR2020-1370, Paper 9, at JA-147-JA-149. Volterra's mischaracterizations of the patent's disclosures provides a further reason why this term should be construed.

3. Plaintiff's Reply Position

MPS's construction injects confusion where none need exist. MPS edits its proposed construction in the JCCS to remove the word "mutual" and to add a bracketed clarification, but the need to use a bracketed phrase to "offer context for how the term should be interpreted" reveals that MPS's proposal is problematic at the outset. (Joint Brief at n.4.) Indeed, MPS proposes four more alternative constructions that it alleges are "the technically precise meaning of 'orienting, in like direction.'" (*Id.* at n.6.) MPS acknowledges that "these constructions would be less helpful to the jury because they contain **more** technical jargon," tacitly admitting that its other proposals also inject confusing jargon. (*Id.* (emphasis added).)

MPS's removal of the word "mutual" does not make its construction any less confusing. The jury will be unfamiliar with flux, whether it be "magnetizing flux" or "leakage flux," which are both addressed by the patent. Indeed, in claims that actually refer to one of these fluxes, the inventors explicitly defined the term to

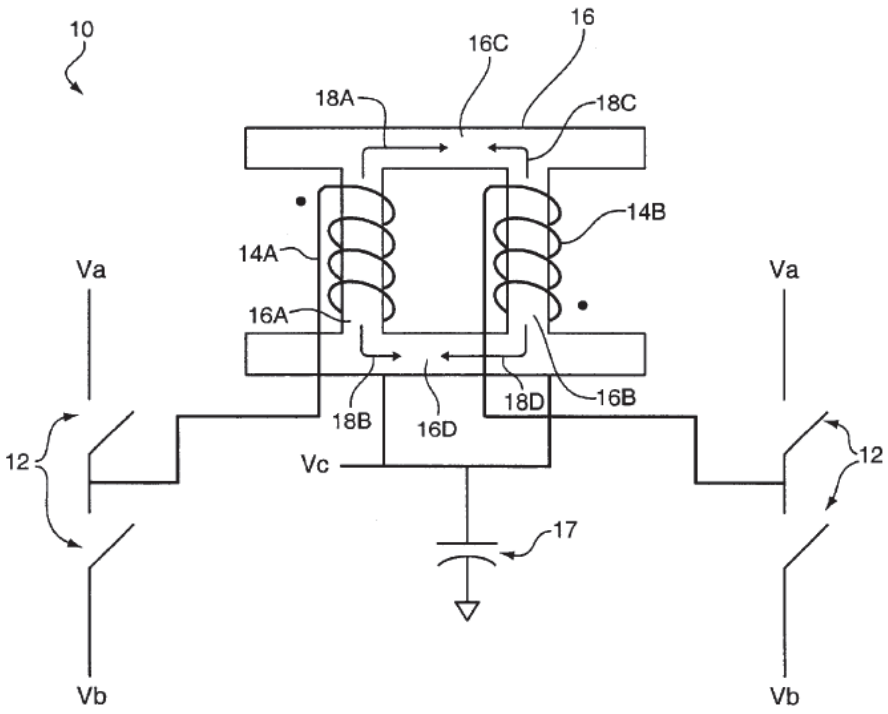
remove any confusion. (*See* D.I. 134-1 at Claims 8, 29.) On the other hand, the jury needs no definition to comprehend what it means to "orient" two things in a "like direction," especially when considered in the context of the examples provided by the specification. (*See, e.g.*, *id.* at FIGs. 3A-B; 2:24-28; 7:15-160.)

MPS also mistakenly concludes that "[i]n the context of this patent, 'same' or 'like' direction actually means the opposite direction." Not so. "Same" and "like" direction are used according to their ordinary meaning. (*Compare* Cl. 17 ("orienting, in like direction, first and second windings about a common core"), *with* Cl. 1 ("the first winding being wound about the core in a first orientation, the second winding being wound about the core in the first orientation").)

The inventors knew how to claim aspects of the flux when they wanted to, and they did this separately from the windings' orientation. For example, Claim 25 similarly requires "each of the N windings being wound about the core in like orientation." Claim 29 depends from Claim 25 and adds the requirement that "one or more of the windings comprise a gapped high permeability element to carry at least part of a leakage flux, the leakage flux being defined as a flux present when each of the windings has an equal DC current." As such, even when windings are oriented in a like orientation, they are capable of producing magnetizing and leakage fluxes—a distinction MPS's proposal wholly ignores.

Like Claim 25, Claim 17 also separately claims the orientation of the windings and the current that flows through them. In particular, Claim 1 first requires "orienting, in like direction, first and second windings" and then requires "alternatively activating each winding." The patent explains that "activation" is "when windings are coupled to a voltage, Va or Vb" and "effect a change of flux 18 in core 16." (*Id.* at 5:14-16.) On the other hand, "orienting" the windings is unrelated to flux because each winding can generate flux in either direction after being oriented "in like direction." (*Id.* at 5:20-26 ("when winding 14A is activated by Va, an increase of flux in direction 18A is generated; when winding 14A is activated by Vb, an increase of flux in direction 18B is generated; when winding 14B is activated by Va, an increase of flux in direction 18C is generated; when winding 14B is activated by Vb, an increase of flux in direction 18D is generated").)

FIG. 1



In sum, MPS's proposal not only mistakenly attributes the generation of flux to the orientation of the windings, it also mistakenly concludes that flux can only flow "in opposite directions."

4. Defendant's Sur-Reply Position

MPS's construction is necessary because a juror would not know whether "orienting in like direction" means (1) physically orienting the windings in like direction, (2) orienting the winding current in like direction, or (3) orienting the magnetic flux flow in opposite directions. The specification clarifies "like direction" means that the flux flows in opposite directions. *See* '986 at 7:19-23

EXHIBIT 33

IN THE UNITED STATES DISTRICT COURT

FOR THE DISTRICT OF DELAWARE

VOLTERRA SEMICONDUCTOR, LLC,

Plaintiff,

v.

CASE NO.: 19-02240

MONOLITHIC POWER SYSTEMS, INC.,

Defendant.

RESTRICTED - ATTORNEYS' EYES ONLY

VIDEOTAPED REMOTE DEPOSITION OF

JOSHUA WILLIAM PHINNEY

Friday, October 22, 2021

9:05 a.m. Eastern Daylight Time

Reported by:

GRETA H. DUCKETT, CCR, RPR, CRR, CVR-S, RVR-M-S

JOB NO.: 3426

like direction, because they've been wound such that the flux has that -- the opposite directions.

Q. And the flux has the opposite directions when the current passes from Vx1 and Vx2 to Vc, correct?

A. Yeah. It will do it for that condition. I think it will even do it if it's coming from the load 2. I think you'll still have the condition where the flux will collide. It will, perhaps, just go the other way if the current is reversed.

Q. So you're saying if we go from Vc to both Vx1 and Vx2, we'll still collide in the opposite direction, right?

A. I think that's right. If you don't mind me holding up my hand and just looking. Yeah, that's right.

Q. What if our current goes from Vx1 to Vx2?

A. So there's no load -- no load current on Vout?

Q. Right.

A. In that case, unless I'm mistaken -- I haven't considered this until you

asked. But if I'm not mistaken, the flux in both windings will go in the same direction. The structure will generate a high impedance to that current. That's effectively a differential mode current. Because by the terms of your question, we've made the current into one winding, like into the terminal Vx1 is equal and opposite with the current in Vx2. So the current I put into Vx2 comes out of the -- the current I put into Vx1 comes out of Vx2. That is a differential mode current. And that will -- that's what the structure is designed to impede. It will generate a large impedance because that will link flux into the core. That will no longer have the property of, you know, of -- of because of symmetric excitation, forcing the flux to not go through the mutual pathway, but return through the leakage pathways.

Q. If the current went from Vx1 to Vx2, you said that the fluxes would then both be going in the same direction around the core, right?

A. Yeah. I think that's right because you're -- if I'm understanding your question

right, you're saying that the current I put into Vx1 will be the current that comes out of Vx2.

Q. And if the current you put into Vx1 came out of Vx2, would this inductor in Figure 3A still be in like orientation?

A. I haven't considered that, but I think, yes, it would. And that's why it would act as a differential mode choke. That's why -- because it was oriented in like direction, that's why it would generate a large impedance in response to that differential mode current.

Q. And it's desirable to have the inductor act as a differential mode choke for this particular application, right?

A. I think, for interleaved converters, it can be a great idea. This is -- you know, this is a -- something that's clear from Wong Investigating, for instance, because by alternatively activating the windings and interleaving the windings, you're creating already kind of a differential excitation. You have some parts of the excitation where the current in one winding is doing one thing and

the current in the other winding is going the opposite direction.

You're introducing a lot of differential excitation by interleaving. So this kind of structure is helpful in that regard because it generates impedance for the -- to the differential mode component of the AC current.

Q. If we flip to Figure 1, does this also show windings wound in a like orientation?

MR. RAVULA: Objection.

Vague.

A. I'd say it does. And this is one of the figures that the patent uses to explain what "like orientation" means.

Q. Does -- let me ask you a different question.

Let's go back to your opening report and go to paragraph 51, where you talk about the claim constructions in this case. That's on page 12. Let me know when you're there.

A. I'm there.

Q. And you reviewed the parties' claim construction briefing in this case, right?

A. I reviewed what I cite in the materials reviewed. It's this thing called "the joint claim construction brief." So I don't really know if there's more briefing than that.

Q. But you at least reviewed the joint claim construction brief, right?

A. Yeah. Yes, I did.

Q. And you have the parties' proposed constructions on paragraph 52 of your report, right?

A. Yes.

Q. Do you agree with MPS's proposed constructions?

A. I didn't take a position on them. As I understand, that's, like -- that's like sort of a legal determination which -- you know, what the claim construction is. I'm just trying to apply them and, you know, discuss what they can mean from a technical perspective.

Q. And do you see MPS's proposed construction for orienting in like direction?

A. I do.

Q. MPS's proposed construction

requires the windings to be wound in such a way so that flux between the windings flows in opposite direction about the common core, right?

A. Yes.

Q. We discussed how the flux between the windings will flow in opposite directions about the common core when the current is flowing to the output, right?

A. And what current -- because we talked about -- you don't mean -- we were saying the current was a differential mode where it went to the output and then came back.

Q. So maybe it would be helpful if we looked back at the patent in Figure 3A in light of MPS's construction. Can you see Figure 3A?

A. Yes.

Q. Okay. So MPS's construction requires the windings to be wound in such a way so that flux between the windings flows in opposite directions about the common core. And that would occur when the current flows from Vx1 to Vc and also from Vx2 to Vc, right?

A. That would happen in that case, but it goes back to sort of the point of Figure 3A

and 3B -- is that you can both change the sense of the windings, like how it's wound, if it goes around to the right or the left or to the top or the bottom and that current direction. So both of those go into the direction of the flux. So the important thing to, you know, I think, take away is that to be oriented in like direction, that they do need to be wound in such a way that the flux will collide.

Q. We talked about how, if the current flows from Vx1 to Vx2, then the flux will no longer collide, right?

A. Yes, for the case of no current through the -- there's an open circuit on Vc. There, you imposed a fully differential current, and there, you'll -- the structure will present a large impedance that will link -- that condition will link flux into the core's mutual path.

Q. In that condition, where the current flows from Vx1 and all comes out of Vx2, MPS's construction is no longer satisfied, right?

MR. RAVULA: Objection. Outside the scope.

A. So maybe if you could help me explain. What do you mean, "when the construction is satisfied"?

Q. Well, MPS requires orienting in like direction to have the flux flow in opposite directions, right?

A. Correct.

Q. And we said if the current coming in Vx1 all comes out of Vx2, then the flux no longer flows in opposite directions, does it?

A. That's correct. It goes around the mutual -- the mutual path by the terms of your question, because you have this -- essentially a differential mode current.

Q. And so if we apply MPS's construction of orienting in like direction, then Figure 3A would not be oriented in like direction when the current going into Vx1 all comes out of Vx2, right?

A. That's -- that seems to me to be right because we're just applying -- to apply MPS's construction, we're just looking at the -- that flux direction, as -- because that's -- that's the one that matters for, you know, handling the variations in both the sense

of the windings and the direction of current.

Q. Would we still get the benefit of ripple reduction if the flux always collided in the core?

A. Well, again, this is going back to the type of answer I'm going to have to give when you ask about this. There's different ways of looking at what it means for that flux to collide in the core -- when you just use the word "flux."

Q. What do you understand MPS to mean by "flux" in their construction?

MR. RAVULA: Can you just let him finish his answer, please, instead of interrupting him.

BY MR. PIROUZNIA:

Q. I'm sorry, Dr. Phinney. I thought you were done. Please continue.

A. If you don't mind. Sorry.

One way -- one way is to think about the current that's going to the load. The current going to the load will include DC plus ripple. Right? And as you now wind two conductors from two interleaved buck converters that are carrying DC plus ripple, you can --

when you wind them so that the fluxes are oriented in a like direction, that's meaning that the -- there's a DC flux plus an AC flux component.

And even though the AC flux component can vary out of phase, for instance, for the differential mode component, the DC plus the AC will still always collide. You're always going to bias that material in a way that is -- has this large DC component. So flux -- flux can collide, depending on if you're talking about the total flux, DC plus AC, or if you're looking particularly at the AC common mode component or the AC differential component.

Q. And when you applied MPS's construction, did you understand them to be referring to the total flux, DC plus AC, when they referred to the flux between the windings flowing in opposite directions?

A. I don't think their construction, you know, includes words that say which it has to be. You know, as I was able to show with the Pulse inductor, if you saw how I applied that there, I'm just able to get the current --

EXHIBIT 34

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re *Inter Partes* Review of:	)
U.S. Patent No. 6,362,986	)
Issued: March 26, 2002	)
Application No.: 09/814,555	)
Filing Date: March 22, 2001	)

For: Voltage Converter With Coupled Inductive Windings, And Associated Methods

DECLARATION OF DR. DOUGLAS C. HOPKINS IN SUPPORT OF PETITION FOR *INTER PARTES* REVIEW OF U.S. PATENT NO. 6,362,986

149. Further, using the T-model (shown in paragraph [B9] of Appendix B, *infra*, and in Figure 4 of *Pietkiewicz*), the AC currents through the windings must also be equal when there is strong coupling between them. As explained above in paragraph [147], the mutual inductance between the windings approaches infinity as the coupling coefficient approaches 1. In this scenario (for at least some values of N_1, and N_2 different from N_1), the magnetizing inductance must also approach infinity. As the magnetizing inductance becomes infinitely large, the current through the magnetizing inductor approaches zero. As explained in paragraph [B9], in this scenario, $N_1 i_1 \approx N_2 i_2$ where i_1 and i_2 are AC values.

150. Thus, under the conditions of strong coupling between the two windings of the coupled inductor, the NI product for each of the first and second windings is substantially equal (i.e., $N_1 i_1 \approx N_2 i_2$), for both the DC and AC components of the inductor winding currents i_1 and i_2. A POSA would be motivated to combine *Wong Performance* with *Pietkiewicz* to achieve strong coupling between the windings, thereby further reducing inductor current ripple. *See* paragraphs [73]-[79], *supra*.

17. Claim 17 Of The '986 Patent Is Obvious Over *Wong Performance* In View Of *Pietkiewicz*

151. **The preamble of claim 17 recites a "method for reducing ripple in a DC-to-DC converter of the type producing an output voltage from an input**

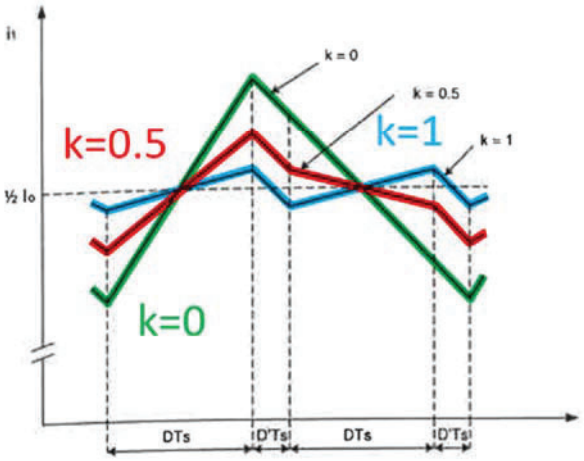
voltage."[9] Even if the preamble of claim 17 is limiting, *Wong Performance* in view of *Pietkiewicz* discloses this limitation.

152. *Pietkiewicz* discloses a "method for reducing ripple in a DC-to-DC converter" in Figure 10. In particular, Figure 10 of *Pietkiewicz* (annotated below) shows the current ripple reduction that results from increasing the coupling coefficient (k) from 0 to 1 between the two windings of a DC-to-DC converter. Ex. 1007 at 44-45 (Section 3, Figure 10). The main point of the annotations (which are directly supported by the figure and disclosures of *Pietkiewicz* at 44-45, Section 3) is to show that as the absolute value of the coupling coefficient increases, the current ripple in the device decreases. *See also* paragraphs [B21], [B24]-[B26] for a discussion regarding current ripple, paragraphs [B13]-[B14] for a discussion regarding the coupling coefficient, and paragraph [B23] for a discussion regarding duty cycle of Appendix B below. A POSA would know how to and be motivated to combine *Wong Performance* and *Pietkiewicz* to ensure additional reductions in

[9] For purposes of this Declaration, I will assume that claim 17, including claim element 17[pre], and its dependent claims are not indefinite. However, I will note some concerns I have about the definiteness of claim 17. Claim element 17[pre] is indefinite at least because the claim does not provide a reference point for measuring or determining a reduction in ripple.

current ripple and power losses as the coupling coefficient is increased to a value where the magnetizing inductance is at least three times greater than the leakage inductance of either winding. *See* paragraphs [73]-[79], *supra*.

Annotated Figure 10 of *Pietkiewicz*



153. Finally, Figure 4 of *Wong Performance* discloses a DC-to-DC converter that produces an output voltage from an input voltage in Figure 4. Figure 4 (annotated below), which shows a circuit diagram for the DC-to-DC converter discussed in *Wong Performance*, depicts an output voltage generated from an input voltage. Ex. 1005 at 318 (Section II, Figure 4). Figure 4 shows an input voltage on the left side of the circuit and that input voltage is fed into a circuit that generates an output voltage on the right hand side of the circuit. *Id*. That is what it means for an output voltage to be produced from an input voltage, as required by the preamble of

claim 17. Figure 4 has been annotated in accordance with the above disclosure found in *Wong Performance*. *See, e.g.*, Ex. 1005 at 318 (equations (3) and (4)), which reference the input voltage V_{in} and output voltage V_o. *See also id*. at 318-19, 322, which explain how the steady-state current ripple is reduced for inversely coupled windings as a function of duty cycle and increased coupling between the windings.

Annotated Figure 4 of *Wong Performance*

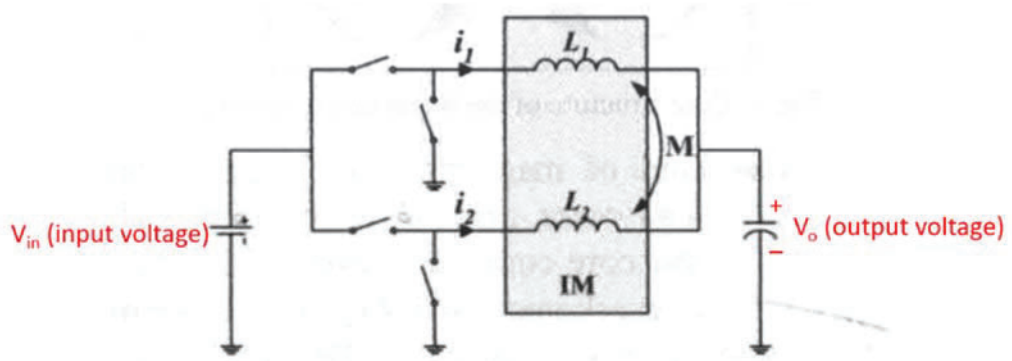


Fig. 4. Interleaving converter with coupling output inductor.

154. **Element [a] of claim 17 recites "orienting, in like direction, first and second windings about a common core to increase coupling between the windings."**[10] *Wong Performance* in view of *Pietkiewicz* discloses this limitation of

[10] For purposes of this Declaration, I will assume that claim 17, including claim element 17[a], and its dependent claims are not indefinite. However, I will note some concerns I have about the definiteness of claim 17. Claim element 17[a] is indefinite at least because the '986 patent does not explain how "orienting, in like

claim 17. As explained above in paragraph [45], *supra*, "orienting, [windings] in like direction" in the context of the '986 patent means "having mutual flux between windings flow in opposite directions."

155. Further, as shown in Figure 3 of *Wong Performance* (annotated below), the first and second windings are wound about a common core and the mutual flux generated by the windings of L_1 is clockwise and the mutual flux generated by the windings of L_2 is counterclockwise. Ex. 1005 at 318 (Section II, Figure 3). *See also* paragraph [45], *supra*, for a discussion of mutual flux. Therefore, *Wong Performance* discloses "orienting, in like direction, first and second windings about a common core." Similarly, *Pietkiewicz* also discloses "orienting, in like direction, first and second windings about a common core." In Figure 2 of *Pietkiewicz* (annotated below), the mutual flux generated by the first winding is counterclockwise and the mutual flux generated by the second winding is clockwise.

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direction, first and second windings about a common core [] increase[s] coupling between the windings." Specifically, the '986 patent does not provide a reference point against which "increase[d] coupling between the windings" can be determined or measured. For at least these reasons, independent claim 17 and all claims dependent on claim 17 are indefinite.

EXHIBIT 35

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re *Inter Partes* Review of:	)
U.S. Patent No. 6,362,986	)
Issued: March 26, 2002	)
Application No.: 09/814,555	)
Filing Date: March 22, 2001	)

For: Voltage Converter With Coupled Inductive Windings, And Associated Methods

DECLARATION OF DR. DOUGLAS C. HOPKINS IN SUPPORT OF PETITION FOR *INTER PARTES* REVIEW OF U.S. PATENT NO. 6,362,986

16. Claim 17 Of The '986 Patent Is Obvious Over *Pietkiewicz*

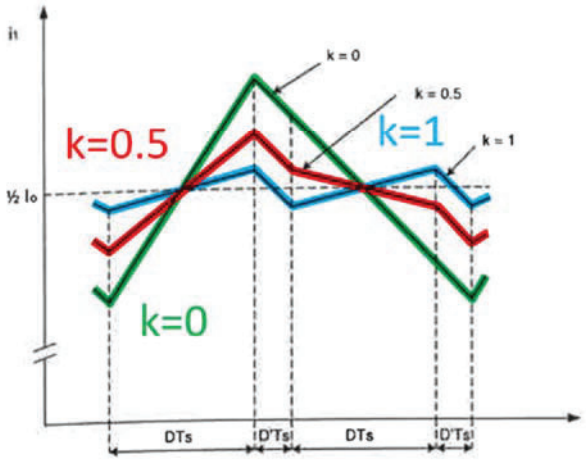
135. **The preamble of claim 17 recites a "method for reducing ripple in a DC-to-DC converter of the type producing an output voltage from an input voltage."**[5] Even if the preamble of claim 17 is limiting, *Pietkiewicz* discloses this limitation.

136. *Pietkiewicz* discloses a "method for reducing ripple in a DC-to-DC converter" in Figure 10. In particular, Figure 10 of *Pietkiewicz* (annotated below) shows the current ripple reduction that results from increasing the coupling coefficient (k) from 0 to 1 between the two windings of a DC-to-DC converter. Ex. 1107 at 44-45 (Section 3, Figure 10). The main point of the annotations (which are directly supported by the figure and disclosures of *Pietkiewicz* at 44-45 (Section 3)) is to show that as the absolute value of the coupling coefficient increases, the current ripple in the device decreases. *See also* paragraphs [B21], [B24]-[B26] for a discussion regarding current ripple, paragraph [B13]-[B14] for a discussion

[5] For purposes of this Declaration, I will assume that claim 17, including claim element 17[pre], and its dependent claims are not indefinite. However, I will note some concerns I have about the definiteness of claim 17. Claim element 17[pre] is indefinite at least because the claim does not provide a reference point for measuring or determining a reduction in ripple.

regarding the coupling coefficient, and paragraph [B23] for a discussion regarding duty cycle. A POSA would know how to and be motivated to ensure additional reductions in current ripple and power losses as the coupling coefficient is increased to a value where the magnetizing inductance is at least three times greater than the leakage inductance of either winding, as explained in paragraph [108].

Annotated Figure 10 of *Pietkiewicz*



137. Finally, Figure 11 of *Pietkiewicz* (shown annotated and explained in paragraph [95]) shows how the DC-to-DC converter discussed therein produces an output voltage from an input voltage. Also, as explained above in paragraph [96] in relation to claim 1, a POSA reading *Pietkiewicz* would have found it obvious to use the coupled inductor in a conventional DC-to-DC converter notwithstanding that the coupled inductor is part of a current doubler rectifier driven by a full bridge and transformer. Given the simplified circuits shown in Figures 6-9 of *Pietkiewicz* and

the excitation waveforms across the windings shown in Figure 14 of *Pietkiewicz*, it would have been obvious to a POSA that the coupled inductor could have been used in a conventional DC-to-DC switching buck converter. *See* paragraph [B19] of Appendix B.

138. **Element [a] of claim 17 recites "orienting, in like direction, first and second windings about a common core to increase coupling between the windings."**[6] *Pietkiewicz* discloses this limitation of claim 17. As explained above in paragraph [45], "orienting, [windings] in like direction" in the context of the '986 patent means "having mutual flux between windings flow in opposite directions."

[6] For purposes of this Declaration, I will assume that claim 17, including claim element 17[a], and its dependent claims are not indefinite. However, I will note some concerns I have about the definiteness of claim 17. Claim element 17[a] is indefinite at least because the '986 patent does not explain how "orienting, in like direction, first and second windings about a common core [] increase[s] coupling between the windings." Specifically, the '986 patent does not provide a reference point against which "increase[d] coupling between the windings" can be determined or measured. For at least these reasons, independent claim 17 and all claims dependent on claim 17 are indefinite.